DESCRIPTION

DISPLAY STRIP AND COMMODITY DISPLAY UNIT

TECHNICAL FIELD

[0001]

The invention relates to a display strip having sufficient punch hole strength for allowing a plurality of product-enclosed bags to be attached thereto for the purpose of arrangement and display, and package assembly.

BACKGROUND ART

[0002]

Some products such as snack foods are generally packed in pillow packages (such as vertical pillow types and horizontal pillow types) and sold. In many cases, such product-enclosed bags are arranged on display racks in stores and sold. In such cases, each and every bag has to be placed on the racks by hand, and the display place for sale is restricted only to the given display racks.

[0003]

A known display method for product sale, called strip bag display, requires no display rack. As shown in Fig. 1, the strip bag display is a display form in which plurality of products are each attached to a tape material with a certain width, called a display strip, and hung. This display form needs no display rack and enables display and sale at any place such as a place beside a register in a store and a front desk area in a hotel.

[0004]

In a conventional display strip form, for example, a pressure-sensitive adhesive tape is fixed on the back side of a paper or resin tape that has preliminarily punched holes in certain positions, through which product-enclosed bags are each attached to the pressure-sensitive adhesive

tape. In another form, for example, a paper or resin tape has resin hooks preliminarily fixed thereon in certain positions, and product-enclosed bags are each punched and hung on the hook through the punched hole. However, these display strip forms have difficulty in automating the process of attaching product-enclosed bags to the display strip. Thus, the strip bag display has not been widely used yet.

[0005]

Against this problem, yet another display strip is proposed which has a heat sealing layer on one side such that product-enclosed bags can be directly bonded to the display strip by heat sealing (for example, see Patent Documents 1 to 4 listed below). With this display strip, it is very easy to automate a continuous process including the steps of enclosing a product in a bag and attaching the product-enclosed bag to the display strip.

[0006]

One end of such a display strip is hung on a hook provided on a rack and the like in order to display a plurality of the product-enclosed bags which are arranged and fixed on the display strip. For such display by hanging on the hook, a punch hole is generally formed at an end portion of the display strip. The hole punching process can easily be performed by punching using a punch and thus is preferably used for mass production at low cost. However, the display strip can often be broken at the punch hole portion, even though it is designed to have sufficient strength for use in a state where a specific number of product-enclosed bags are attached to it and even though it is designed to have a strength that enables it to withstand an impact when the displayed product-enclosed bag is pulled and peeled.

Patent Document 1: WO 98/52823

Patent Document 2: U.S. Patent No. 3,864,895

Patent Document 3: U.S. Patent No. 5,366,777
Patent Document 4: U.S. Patent No. 5,433,060

DISCLOSURE OF THE INVENTION

PROBLEMS WHICH THE INVENTION IS TO SOLVE

[0007]

Under the circumstances, it is an object of the invention to provide a display strip having sufficient punch hole strength for allowing a plurality of product-enclosed bags to be attached thereto for the purpose of arrangement and display, and package assembly.

MEANS FOR SOLVING THE OBJECT

[0008]

The invention is a display strip for allowing a plurality of product-enclosed bags to be attached thereto for the purpose of arrangement and display, which at least comprises a substrate layer containing a woven fabric and a sealant layer having heat-sealability, a punch hole being formed at an upper portion for hanging.

The invention is described in detail below.

[0009]

The inventors have made investigations on a cause of the frequent breakage of the conventional display strip at the punch hole portion and finally found that the punch hole strength is extremely reduced when a notch-like incision is formed at the punch hole portion due to blunting of the edge of the knife for forming punch holes. Such a notch is inevitably formed as long as a hole punching process with a punch is performed. The inventors have made further investigations and finally found that if a woven fabric-containing substrate layer is used, the extreme reduction in punch hole strength can be inhibited even when a notch is formed, so that the invention has been completed.

[0010]

The display strip of the invention comprises at least a substrate layer and a sealant layer. The substrate layer contains a woven fabric. An extreme reduction in punch hole strength can be inhibited by the use of such a substrate layer, even when a notch is formed.

[0011]

The substrate layer is not particularly limited, but it is preferably a laminate with the woven fabric and a resin film laminated, particularly preferably a laminate having a structure with the woven fabric sandwiched between two resin films (hereinafter also referred to as "the laminate in the first aspect") or a laminate with the woven fabric and paper laminated via a resin layer or an adhesive (hereinafter also referred to as "the laminate in the second aspect").

[0012]

The woven fabric is not particularly limited, but woven fabrics produced by weaving fibers which are conventionally used as reinforcing materials by any known conventional method such as plain weaving, twill weaving and leno weaving. The density of weave of the woven fabric is not particularly limited, but it is preferably about 4 to 20 per inch. When the woven fabric is laminated to a resin film, any appropriate space between warp yarn and weft yarn can improve the adhesion between the woven fabric and the resin film, because part of the resin of the resin film can be infiltrated into the space between the warp yarn and the weft yarn of the woven fabric and integrated with the woven fabric.

[0013]

The woven fabric is not particularly limited, but it preferably comprises polyolefin yarn such as high density polyethylene yarn, low density polyethylene yarn, metallocene linear low-density polyethylene yarn, isotactic

polypropylene yarn, and syndiotactic polypropylene yarn, in view of mechanical performance, and adhesion to the resin film and the like, which are required for the display strip. The polyolefin yarn may comprise a single resin, it may be a sheath-core type bi-component fiber having a core layer of a high melting point polymer and a sheath layer of a low melting point polymer, as needed. If such a bi-component fiber is used, both high mechanical strength and adhesion to the resin film can be achieved at the same time.

[0014]

The polyolefin yarn is not particularly limited, and for example, monofilament yarn, multifilament yarn, flat yarn, split yarn and the like, may be used.

The monofilament yarn may be produced by extruding a molten and kneaded polymer through a single hole by means of an extruder and performing drawing and the like to form a fibrous product. For the purpose of not only imparting strength properties to the fiber but also imparting adhesive properties to the fiber surface, composite monofilament yarn which is produced using a nozzle having a concentric double discharge-hole structure, and foamed monofilament yarn which is produced by a process of adding a foaming agent to a molten and kneaded polymer and extruding and spinning the polymer into fibers, can be used.

The multifilament yarn comprises a number of single fibers, which is generally formed by extruding a molten polymer through a spinning nozzle having a plurality of discharge ports, cooling and solidifying the polymer, and then drawing and heating the polymer. In some cases, false twisting and the like are performed to prevent spreading out of single fibers.

The flat yarn may be produced by forming a film by extrusion method and the like, slitting the film into pieces each with a specific width, and then drawing and heating the pieces.

The split yarn may be produced by further subjecting the flat yarn to splitting and weaving.

Particularly, the flat yarn and the split yarn are known to have extremely high tensile strength and tear strength.

The fineness of the polyolefin yarn is not particularly limited, but it is generally about 100 to 5000 dt.

[0015]

The substrate layer comprising the woven fabric can form a display strip having high punch hole strength, however, in some cases, the punch hole strength should further be increased in order that the punch hole portion should not be broken even when a customer detaches a product-enclosed bag from the display strip with strong force.

The inventors have found that weft yarn having fineness thicker than that of warp yarn is preferably used in order to achieve a punch hole strength that allows the display strip to withstand the strong force for pulling the bag. In particular, warp yarn preferably comprises flat yarn or split yarn having a flat cross section and weft yarn preferably comprises monofilament yarn or multifilament yarn which is thicker than the warp yarn and each has a round cross section, in the woven fabric. This is supposed to be because the cross section of the monofilament yarn or multifilament yarn is nearly circular so that when a load is abruptly applied, the single fibers that form the yarn can move between the single fibers or move at intersections and the like between the yarn and the warp yarn and the like to facilitate absorption of the stress. The woven fabric having such a structure has a relatively small contact area between the warp yarn and weft yarn, and therefore, it is believed that when an impact load is applied, contact portions between the warp

yarn and the weft yarn should be broken so that the weft yarn can move to absorb the impact.

In contrast, in a woven fabric, wherein warp yarn comprises flat yarn or split yarn having a flat cross section and the weft yarn also comprises flat yarn or split yarn having a similar flat cross section, the warp yarn can serve as a guide to promote the destruction of the weft yarn so that the weft yarn can be broken, when an impact load is applied. It is believed that in such a structure, the warp yarn and the weft yarn adhere to one another at surfaces so that when an impact load is applied, the weft yarn itself can be tightly pressed by the warp yarn to be broken, while the contact portions cannot be separated from one another.

[0016]

The resin film which forms the laminate in the first aspect is not particularly limited, but the resin film preferably comprises polyester, polyolefin and the like. In particular, polyester films are preferred because they have appropriate stiffness and mechanical strength.

If the woven fabric has low adhesion to a polyester film, the woven fabric and the polyester film may be laminated via a polyolefin film.

[0017]

The method of producing the laminate in the first aspect is not particularly limited, but a method of forming a resin film layer by extruding a polymer onto the woven fabric, a method of dry-laminating a resin film on the woven fabric, and a method of pressure bonding a resin film to the woven fabric, and the like can be used. Particularly, a thermocompression bonding method which allows the resin of a resin film to infiltrate between the warp yarn and the weft yarn of the woven fabric and to be integrated with the woven fabric, a method of applying an adhesive to the woven fabric such that it infiltrates

between the warp yarn and the weft yarn of the woven fabric and then laminating the woven fabric to a resin film, and the like are preferably used.

[0018]

The laminate in the first aspect may comprise only the woven fabric and the resin film, however, it may further comprise a layer of paper, a nonwoven fabric, a metal foil and the like, as needed.

[0019]

The paper which comprises the laminate in the second aspect is not particularly limited as long as it can impart preferable hardness and form-retaining properties to the display strip, kraft paper, thin paper and the like having a basis weight of about 30 to 300 g/m^2 is generally used.

In the laminate in the second aspect, the woven fabric and the paper are laminated via a resin layer or an adhesive. For example, the woven fabric and the paper may be laminated via a polyolefin resin, particularly a polyethylene resin, being extruded and sandwiched between them, or may be pressed via a polyolefin film, particularly a polyethylene film, being sandwiched between them, or an appropriate adhesive may be applied to the paper, and then the woven fabric may be laminated thereon to form the laminate.

[0020]

In the laminate in the second aspect, a nonwoven fabric in place of the paper may be used and a layer comprised of a metal foil and the like may be used, as needed. In the case of using the nonwoven fabric, particularly using a long-fiber nonwoven fabric, the nonwoven fabric has effects of increasing the punch hole strength. While the inventors have filed a patent application on a display strip comprising a nonwoven fabric-containing substrate layer (PCT/JP2005/010668), the reinforcing effect is greater with the woven fabric

according to the invention than with the nonwoven fabric.

[0021]

The thickness of the substrate layer is not particularly limited, but it is preferable to be 30 to 500 μm. If it is less than 30 μm, the resulting punch hole strength can be insufficient so that displaying or detaching product-enclosed bags can cause breakage. If it is more than 500 μm, the substrate layer can serves as a heat insulator so that heat can insufficiently be conducted to the sealant layer in heat-sealing.

[0022]

The sealant layer is not particularly limited as long as it can show sufficient heat-sealability, however, for example, the sealant layer preferably comprises a low melting point resin. The low melting point resin is not particularly limited, but it includes ethylene-vinyl acetate copolymers, polypropylene, copolymers of propylene and any other olefin, low density polyethylene, and the like.

[0023]

The sealant layer may further contain a commonly used additive such as wax, an ultraviolet blocking agent, an antioxidant, a plasticizer, a lubricant, a pigment, and a dye, as needed.

[0024]

The sealant layer may be formed over substantially the entire surface of the display strip of the invention, may be formed in a striped pattern, or may be formed only at specific portions to which products will be attached. It is preferred that the sealant layer is formed over substantially the entire surface of the display strip, because products can be attached to any part on the display strip. As used herein, the term "substantially" means that the punched portion, the peripheral portion and the like to which no product will be attached may be excluded.

[0025]

The display strip of the invention preferably has an intermediate layer comprised of a resin between the substrate layer and the sealant layer in order to improve the adhesion between the substrate layer and the sealant layer or to increase the strength of the whole of the display strip or the strength of the punch hole. The resin which comprises the intermediate layer is not particularly limited, but it is preferable to be polyolefin such as polyethylene.

[0026]

The form of the display strip of the invention is not particularly limited, but it is in the form of a tape, a sheet and the like. And at one end of the display strip of the invention, a punch hole through which the display strip with products attached thereto can be hung on a hook such that the products can be displayed, is formed.

[0027]

The method of producing the display strip of the invention is not particularly limited, and a known conventional method can be used. For example, a method of bonding the substrate layer to the sealant layer produced by extrusion molding via an adhesive can be used. Alternatively, the sealant layer may be formed on the substrate layer by a coating method.

[0028]

A method of laminating the sealant layer and the substrate layer, which are each independently produced, with polyethylene and the like being extruded and sandwiched between them, or a method of providing a laminated film comprising the sealant layer and a polyethylene layer and the like and laminating the substrate layer to the laminated film on the polyethylene layer side, is preferably used in the case of forming the intermediate layer.

[0029]

Any conventional bag can be used as the bag which encloses the product to be attached to the display strip of the invention, however, a bag comprising at least a sealant layer and a substrate layer is preferred. The sealant layer on the surface of the bag preferably comprises at least one selected from the group consisting of polypropylene, a copolymer of propylene and any other olefin, low density polyethylene, and an ethylene-vinyl acetate copolymer. The sealant layer on the surface of the bag also preferably comprises a heat-sealable biaxial oriented polypropylene (OPH) film. The term "heat-sealable biaxial oriented polypropylene (OPH) film" means a product with heat-sealability that is generally imparted by forming a very thin terpolymer layer comprising a resin having heat-sealability such as a propylene-ethylene-butene terpolymer on the surface of biaxial oriented polypropylene (OPP), and particularly in the U.S. and Europe, it is frequently used for bag materials.

[0030]

The bag for enclosing a product and to be attached to the display strip of the invention include, for example, a bag comprising a biaxial oriented polypropylene (OPP) layer/a printed layer/an adhesive layer/a polyethylene (PE) layer/an aluminum-vapor-deposited polyethylene terephthalate (PET) layer/a polyethylene (PE) layer/a cast polypropylene (CPP) layer; a bag comprising a biaxial oriented polypropylene (OPP) layer/a printed layer/a polyethylene (PE) layer/an aluminum-vapor-deposited polyethylene terephthalate (PET) layer/a polyethylene (PE) layer/a cast polypropylene (CPP) layer; a bag comprising a biaxial oriented polypropylene (OPP) layer/a printed layer/an aluminum-vapor-deposited cast polypropylene (CPP) layer; a bag comprising a biaxial oriented polypropylene (OPP) layer/a printed layer/a polyethylene (PE) layer/an

aluminum-vapor-deposited cast polypropylene (CPP) layer; a bag comprising a transparent vapor-deposited biaxial oriented polyethylene terephthalate (PET) layer/a printed layer/a cast polypropylene (CPP) layer; a bag comprising a heat-sealable biaxial oriented polypropylene (OPH) layer/a printed layer/a polyethylene (PE) layer/an aluminum-vapor-deposited heat-sealable biaxial oriented polypropylene (OPH) layer; a bag comprising a heat-sealable biaxial oriented polypropylene (OPH) layer/a printed layer/a polyethylene (PE) layer/an aluminum-vapor-deposited cast polypropylene (CPP) layer; and a bag comprising a heat-sealable biaxial oriented polypropylene (OPH) layer/a printed layer/an adhesive layer/a polyethylene (PE) layer/an aluminum-vapor-deposited cast polypropylene (CPP) layer.

[0031]

A method of attaching the product-enclosed bag to the display strip of the invention is not particularly limited, however, for example, the product-enclosed bag is first placed in such a manner that the front side of the bag is in contact with the display strip, and then the upper portion of the bag is heat-sealed so that the bag is bonded to the display strip. A specific number of product-enclosed bags are bonded to the display strip, and then each product-enclosed bag is turned upside down around the heat-sealed portion serving as an axis, so that the front face of each bag is reversed against the display strip. In such a state, the display strip is hung on a hook and the like through the punch hole formed at one end of the display strip and displayed, and therefore, if each product-enclosed bag is pulled downward, it can easily be detached from the display strip by a small force.

[0032]

The seal strength between the bag and the display strip is not particularly limited, but it is preferable to

be 1 to 50 N/30 mm. If it is less than 1 N/30 mm, the product can fall under its own weight, depending on the weight of the product, and if it is more than 50 N/30 mm, the hung product-enclosed bag may not be detached by pulling in some cases. It is more preferably 5 to 30 N/30 mm.

[0033]

Using the display strip of the invention, product-enclosed bags can be fixed thereon by heat sealing, and a large number of products can easily be attached thereto by automation. Furthermore, being hung through the punch hole formed at its upper portion, a large number of products can be displayed even in a narrow space. The punch hole has very high strength so that the display strip can be prevented from being damaged by the weight of the products or even when an impact is applied by detaching the product-enclosed bag. Package assembly, which comprises the display strip of the invention and a product-enclosed bag, the display strip and the product-enclosed bag being bonded by heat sealing, also constitutes the invention.

EFFECT OF THE INVENTION

[0034]

According to the invention, a display strip having sufficient punch hole strength for allowing a plurality of product-enclosed bags to be attached thereto for the purpose of arrangement and display, and package assembly can be provided.

BEST MODE FOR CARRYING OUT THE INVENTION

[0035]

The invention is described in more detail by way of the examples, however it is not intended that the invention be limited to these examples.

[0036]

(Example 1)

A substrate layer was formed by bonding a 12 μm-thick biaxial oriented polyethylene terephthalate film to a woven fabric of polyethylene (Meltac Cloth PE-560dt with 8 pieces of warp yarn and 7 pieces of weft yarn woven per one inch, manufactured by HAGIHARA INDUSTRIES INC.) via a 10 μm-thick low density polyethylene (LDPE) film.

The obtained substrate layer and a sealant layer of a 40 μm-thick cast polypropylene (CPP) film were laminated with a 10 μm-thick intermediate layer of low density polyethylene (LDPE) being extruded and sandwiched between them so that a sheet was obtained that had the five-layer structure of PET (12 μm)/LDPE (10 μm)/Meltac Cloth/LDPE (10 μm)/CPP (40 μm).

The obtained sheet was cut into 35 mm-wide strips, which were each punched to have a hole with a diameter of 6 mm on the position of 25.4 mm from the upper end, and 420 mm-long display strips are obtained. With respect to the punch hole, the portion was not completely removed by punching but allowed to remain in such a manner that it was partially hung on the display strip (Fig. 2).

[0037]

(Example 2)

A sheet having the five-layer structure of thin paper (70 g/m^2)/LDPE (10 μm)/Meltac Cloth/LDPE (10 μm)/CPP (40 μm) was obtained in the same manner as Example 1 except that thin paper (70 g/m^2) was used in place of the 12 μm-thick biaxial oriented polyethylene terephthalate film.

The obtained sheet was cut into 35 mm-wide strips, which were each punched to have a hole with a diameter of 6 mm on the position of 25.4 mm from the upper end, and 420 mm-long display strips are obtained.

[0038]

(Example 3)

A substrate layer was formed by bonding a 20 μm-thick

biaxial oriented polypropylene (OPP) film to a Tarpee sheet (NZ1, 100dt-8×5, manufactured by HAGIHARA INDUSTRIES INC.) via a 10 μm-thick low density polyethylene (LDPE) film.

The obtained substrate layer and a sealant layer of a 50 μm-thick ethylene-vinyl acetate copolymer (EVA) film were laminated with a 10 μm-thick intermediate layer of low density polyethylene (LDPE) being extruded and sandwiched between them so that a sheet was obtained that had the five-layer structure of OPP (20 μm)/LDPE (10 μm)/Tarpee sheet/LDPE (10 μm)/EVA (50 μm).

The obtained sheet was cut into 35 mm-wide strips, which were each punched to have a hole with a diameter of 6 mm on the position of 25.4 mm from the upper end, and 420 mm-long display strips are obtained.

[0039]

(Example 4)

A substrate layer was formed by bonding a sheet of 50 g/m^2 bleached kraft paper to a woven fabric (Meltac Cloth) of 330 dt composite polyethylene flat warp yarn (8 /inch) and 440 dt composite monofilament polyethylene weft yarn (7 /inch) via a 20 μm-thick low density polyethylene (LDPE) film.

The obtained substrate layer and a sealant layer of a 50 μm-thick ethylene-vinyl acetate copolymer (EVA) (Melthene MX06 manufactured by TOSOH CORPORATION) were laminated with 15 μm-thick low density polyethylene (LDPE) being extruded and sandwiched between them so that a sheet was obtained that had the five-layer structure of bleached kraft paper (50 g/m^2)/LDPE (20 μm)/Meltac Cloth/LDPE (15 μm)/EVA (50 μm).

The obtained sheet was cut into 35 mm-wide strips, which were each punched to have a hole with a diameter of 6 mm on the position of 25.4 mm from the upper end, and 420 mm-long display strips are obtained.

[0040]

(Comparative Example 1)

A substrate layer of a 50 μm-thick general-purpose biaxial oriented polyethylene terephthalate (PET) film and a sealant layer of a 50 μm-thick cast polypropylene (CPP) film were laminated with an intermediated layer of 30 μm-thick low density polyethylene (LDPE) being extruded and sandwiched between them so that a sheet was obtained that had the three-layer structure of PET (50 μm)/LDPE (30 μm)/CPP (50 μm).

The obtained sheet was cut into 35 mm-wide strips, which were each punched to have a hole with a diameter of 6 mm on the position of 25.4 mm from the upper end, and 420 mm-long display strips are obtained.

[0041]

(Comparative Example 2)

A substrate layer of a 50 μm-thick general-purpose biaxial oriented polypropylene (OPP) film and a sealant layer of 40 μm-thick metallocene low density polyethylene (m-LLDPE) were laminated with an intermediated layer of 30 μm-thick low density polyethylene (LDPE) being extruded and sandwiched between them so that a sheet was obtained that had the three-layer structure of OPP (50 μm)/LDPE (30 μm)/m-LLDPE (40 μm).

The obtained sheet was cut into 35 mm-wide strips, which were each punched to have a hole with a diameter of 6 mm on the position of 25.4 mm from the upper end, and 420 mm-long display strips are obtained.

[0042]

(Evaluation)

The display strips produced in Examples 1 to 4 and Comparative Examples 1 and 2 were evaluated by the methods below.

The results are shown in Table 1.

[0043]

(1) Measurement of Punch Hole Strength

An about 1 mm notch was intentionally formed at the punch hole portion in the obtained display strip. Each display strip was hung on a hook for hanging through the notched portion of the punch hole and pulled downward at a rate of 300 mm/minute, and the strength required to break the display strip was measured. The resulting value was defined as the punch hole strength.

[0044]

(2) Bag Pulling Test

Bags were attached to the obtained display strip to form package assembly by means of Strip Bag Applicator (manufactured by ISHIDA CO., LTD., which is disclosed in U.S. Patent Publication No. 2004/043882). The bag was firstly attached to the position of 40 mm from the upper end of the display strip. 6 bags (size of each bag: 140 mm in width, 180 mm in length, each containing 100 g of snack foods) were attached at a pitch of 60 mm to a single display strip. Each bag was attached by heat sealing under the conditions of 105°C and 250 msec.

Each bag was detached from the obtained package assembly by holding and pulling it by hand at a rate corresponding to a pulling rate of about 2000 mm/minute. The test was performed on 10 display strips with respect to each type, and the number of the display strips in which the punch hole was broken in the process of detaching the 6 bags was counted.

[0045]

[Table 1]

	Punch hole strength (N)	Number of display strips with punch hole broken (broken strips/10 strips)
Example1	45	8
Example2	57	9
Example3	72	8
Example4	65	0
Comparative Example1	7	10
Comparative Example2	4	10

INDUSTRIAL APPLICABILITY

[0046]

According to the invention, a display strip having sufficient punch hole strength for allowing a plurality of product-enclosed bags to be attached thereto for the purpose of arrangement and display, and package assembly can be provided.

BRIEF DESCRIPTION OF DRAWINGS

[0047]

Fig. 1 is a schematic view showing a strip bag display using a display strip.

Fig. 2 is a schematic view showing the punch hole part of the display strip produced in Examples.